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Towards the Fabrication of Polyelectrolyte-Based Nanocapsules for Bio-Medical Applications

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Abstract

© 2016, Springer Science+Business Media New York.The delivery and controlled release of drugs in the human body is one of the main research fields of nanotechnology applied to medicine. An ideal drug carrier should be able to deliver drug molecules to the site of action and to interact specifically with target cells. In this perspective, different organic and inorganic nanosystems have been proposed and tested. One of the most interesting techniques for the synthesis of drug carriers is represented by the layer-by-layer self-assembly (LbL) of nanoengineered shells onto sacrificial templates. However, this technique has been mostly applied for the fabrication of hollow microcapsules, while targeting single cells would require the fabrication of nanocapsules. LbL-based nanocapsules have been proposed in the literature using inorganic nanoparticles or polymeric ones as sacrificial templates, requiring the use of organic solvents for their removal. In the view of a perspective application of such nanocapsules, the use of biocompatible and biodegradable reagents plays a pivotal role. In this respect, recently, the possibility of synthesizing in a highly controlled way calcium carbonate nanoparticles has opened new perspectives for such kind of carrier systems.

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Keywords

Calcium carbonate, Drug delivery, Layer-by-layer self-assembly